

VALUATION OF PHOSPHOBUS IN PIG

7" per cent. MnO, 55 per cent. (CaO and MgO) and 2*3 per cent. Al₂O₃, etc.

This slag must now be removed from the metal. This admits of being most simply performed if one taps out the whole bath, whereby then the slag is won, whilst the metal must be further decarburised and therefore must be returned again into the open-hearth furnace.

The extent of the decarburisation which the metal should have undergone during the winning of the phosphoric slag depends upon the composition of the pig iron employed, and admits of being easily calculated as follows :—For example., if the pig iron contained as above 0*64 per cent. Si, 1 per cent. P, 2 per cent. Mn and 4 per cent. C, the elimination of the substances Si, Mn and P would need 14*3 per cent. FeO according to the preceding, whilst these substances for their elimination on complete decarburisation there would only be required $0\cdot64 \times 4 \times 32 + 1 \times 4 \times 34 - 2 \times \text{Mn} \times 0\cdot97 = 8\cdot84$ per cent. Fe₂O₃; there would thus have been an excess of $14\cdot30 - 8\cdot84 = 5\cdot46$ per cent. FeO employed which was capable of removing, according to formula 73, $\frac{1}{2} \times 52 = 1\cdot52$ C. The

carbon content of the metal must then on the first tapping amount to $4\cdot0 - 1\cdot52 =$ about 2*5 per cent.

For each 1 per cent. more phosphorus in the charge, the surplus of iron peroxide in winning phosphoric acid increases to the extent of 7*8 (vide 64)— $4\cdot3$ (vide 69)=3*5 per cent., and owing to this the carbon content in the dephosphorised metal

be further lowered to the extent of $r =$ about 1 per cent. G.

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One sees that the Bertrand-Thiel process actually fulfils all the conditions which render possible the complete utilisation of the phosphorus, and further perceives that it possesses a superiority over the Thomas-Gilchrist process, in that losses of phosphorus through volatilisation are completely prevented. In spite of the process having now been so many years in use, brands of pig iron with low phosphorus content (1 per cent.) have not been brought into use in large quantities for winning saleable phosphate slags.

In many works, the circumstances are such that pig iron